AMENDMENTS TO THE CLAIMS

1.-38. (Canceled)

39. (New) A rear-drive vehicle comprising:

a self-locking differential;

an engine producing a drive torque (Tm) which is transmitted to the rear drive wheels by the self-locking differential;

an accelerator pedal which modulates the drive torque (Tm) generated by the engine;

a brake pedal which modulates a brake torque acting on the vehicle;

a number of sensors for real-time detecting respective dynamic parameters of the vehicle;

a regulating device for regulating the lock percentage (%L) of the differential; and

a central control unit for controlling the regulating device to regulate the lock percentage (%L) of the differential as a function of the dynamic parameters of the vehicle;

the vehicle is characterized in that when cornering the central control unit reduces the lock percentage (%L) of the differential when the accelerator pedal is pressed and increases the lock percentage (%L) of the differential when the accelerator pedal is released.

40. (New) A vehicle as claimed in Claim 39, wherein the self-locking differential comprises a box body; a bevel gear pair housed in the box body, and which transmits the drive torque (Tm) to the two rear drive wheels by means of respective axle shafts; and a lock devicefor partly locking one axle shaft with respect to the box body; the lock device comprising a clutch in turn having a number of disks integral with one of the axle shafts, and a thrust chamber filled with a fluid under pressure (P) to exert variable axial thrust on the disks.

41. (New) A vehicle as claimed in Claim 40, wherein the regulating device regulates the pressure (P) of the fluid inside the thrust chamber.

42. (New) A vehicle as claimed in Claim 41, wherein the regulating device comprises a solenoid valve for selectively connecting the thrust chamber to a tank into which the fluid is drained, or to a tank for supplying the fluid under pressure (P).

43. (New) A vehicle as claimed in Claim 42, wherein the central control unit estimates a target value of the lock percentage (%L) of the differential as a function of the dynamic parameters of the vehicle, estimates a target value (Prif) of the pressure (P) of the fluid inside the thrust chamber as a function of the target value of the lock percentage (%L) of the differential, and controls the solenoid valve to apply inside the thrust chamber the target value (Prif) of the pressure (P) of the fluid.

44. (New) A vehicle as claimed in Claim 43, wherein the regulating device comprises a first sensor for detecting the value of the pressure (P) of the fluid inside the thrust chamber, and a second sensor for detecting the value of the current (I) circulating through the solenoid valve; the central control unit controlling the value of the pressure (P) of the fluid inside the thrust chamber by means of a first control loop employing as a feedback variable the value of the pressure (P) of the fluid inside the thrust chamber, and a second control loop within the first control loop and employing as a feedback variable the value of the current (I) circulating through the solenoid valve.

45. (New) A vehicle as claimed in Claim 39, wherein the central control unit controls the regulating device to regulate the lock percentage (%L) of the differential as a function of the travelling speed (V) of the vehicle, the turning angle (Dvol) of the vehicle, the yaw speed (Psip) of the vehicle, the lateral acceleration (Ay) of the vehicle, the longitudinal acceleration (Ax) of the vehicle, the rotation speed (WrearL, WrearR) of each rear drive wheel, the position (Pacc) of the accelerator pedal, the position (Pbra) of the brake pedal, and the drive torque (Tm).

46. (New) A vehicle as claimed in Claim 39, wherein the reduction in the lock percentage (%L) of the differential is proportional to the lateral acceleration (Ay) of the vehicle, the speed (V) of the vehicle, and the drive torque (Tm) of the engine.

47. (New) A vehicle as claimed in Claim 39, wherein the central control unit reduces the drive torque (Tm) of the engine to limit the power oversteering effect.

48. (New) A vehicle as claimed in Claim 39, wherein, when cornering at substantially steady speed, the central control unit estimates the road grip of the wheels, zeroes the lock percentage (%L) of the differential when the road grip of the wheels is far from the grip limit, and gradually increases the lock percentage (%L) of the differential when the road grip of the wheels nears the grip limit.

49. (New) A vehicle as claimed in Claim 48, wherein the central control unit reduces the lock percentage (%L) of the differential to zero when the road grip of the wheels is almost at the grip limit.

50. (New) A vehicle as claimed in Claim 48, wherein, as the road grip of the wheels nears the grip limit, the central control unit gradually increases the lock percentage (%L) of the differential in proportion to the value of the lateral acceleration (Ay) of the vehicle and the value of the speed (V) of the vehicle.

51. (New) A vehicle as claimed in Claim 48, wherein the central control unit zeroes the lock percentage (%L) of the differential when the value of the turning angle (Dvol) of the vehicle is substantially directly proportional to the value of the lateral acceleration (Ay) of the vehicle, and gradually increases the lock percentage (%L) of the differential when no substantially direct proportion relationship exists between the value of the turning angle (Dvol) of the vehicle and the value of the lateral acceleration (Ay) of the vehicle.

52. (New) A vehicle as claimed in Claim 48, wherein the central control unit estimates the road grip of the wheels by estimating the value of the lateral acceleration (Ay) of the vehicle.

53. (New) A vehicle as claimed in Claim 48, wherein the central control unit estimates the road grip of the wheels by estimating the value of the turning angle (Dvol) of the vehicle and value of the lateral acceleration (Ay) of the vehicle.

54. (New) A vehicle as claimed in Claim 39, wherein, when driving along a substantially straight route, the central control unit zeroes the lock percentage (%L) of the differential in normal driving mode, and gradually increases the lock percentage (%L) of the differential in sport driving mode.

55. (New) A vehicle as claimed in Claim 39, and comprising two axle shafts, each connecting the self-locking differential mechanically to a respective rear wheel; and two torque sensors, each of which is connected to the central control unit, is fitted to a respective axle shaft, and real-time detects the value of the torque transmitted by the self-locking differential to the respective rear wheel via the relative axle shaft; the central control unit controlling the regulating device to regulate the lock percentage (%L) of the differential as a function of the value of the torque transmitted by the self-locking differential to each rear wheel.

56. (New) A vehicle as claimed in Claim 55, wherein each torque sensor is electromagnetic, and measures electromagnetically the torsional deformation of the respective axle shaft to determine the value of the torque transmitted by the axle shaft to the relative rear wheel.

57. (New) A vehicle as claimed in Claim 55, wherein the central control unit predicts time changes in the angular rotation speed of each rear wheel, using the value of the torque transmitted by respective axle shaft, and controls the regulating device to regulate the lock

percentage (%L) of the differential as a function of future time changes in the angular rotation speed of each rear wheel.

58. (New) A vehicle as claimed in Claim 55, wherein the central control unit estimates a target value of the lock percentage (%L) of the differential as a function of the dynamic parameters of the vehicle, and controls the regulating device by means of a feedback control loop employing as a feedback variable the value of the lock percentage (%L) of the differential.

59. (New) A vehicle as claimed in Claim 58, wherein the regulating device comprises a solenoid valve controlled to vary the lock percentage (%L) of the differential, and a second sensor for detecting the value of the current (I) circulating through the solenoid valve; the central control unit controlling the regulating device by means of a first control loop employing the value of the lock percentage (%L) of the differential as a feedback variable, and a second control loop within the first control loop and employing as a feedback variable the value of the current (I) circulating through the solenoid valve.

60. (New) A vehicle as claimed in Claim 55, wherein the central control unit estimates a target value of the lock percentage (%L) of the differential as a function of the dynamic parameters of the vehicle, and controls the regulating device by adding a feedback control loop employing the value of the lock percentage (%L) of the differential as a feedback variable, and a direct open control loop employing the target value of the lock percentage (%L) of the differential as a control variable.

61. (New) A vehicle as claimed in Claim 60, wherein the regulating device comprises a solenoid valve controlled to vary the lock percentage (%L) of the differential, and a second sensor for detecting the value of the current (I) circulating through the solenoid valve; the central control unit controlling the regulating device by means of a first control loop employing the value of the lock percentage (%L) of the differential as a feedback variable, and a second control

loop within the first control loop and employing as a feedback variable the value of the current (I) circulating through the solenoid valve.

62. (New) A rear-drive vehicle comprising:

a self-locking differential;

two axle shafts, each connecting the self-locking differential mechanically to a respective rear wheel;

a number of sensors for real-time detecting respective dynamic parameters of the vehicle;

a regulating device for regulating the lock percentage (%L) of the differential; and

a central control unit for controlling the regulating device to regulate the lock percentage (%L) of the differential as a function of the dynamic parameters of the vehicle;

the vehicle is characterized by comprising two torque sensors, each of which is connected to the central control unit, is fitted to a respective axle shaft, and real-time detects the value of the torque transmitted by the self-locking differential to the respective rear wheel via the relative axle shaft; the central control unit controlling the regulating device to regulate the lock percentage (%L) of the differential as a function of the value of the torque transmitted by the self-locking differential to each rear wheel.

63. (New) A vehicle as claimed in Claim 62, wherein each torque sensor is electromagnetic, and measures electromagnetically the torsional deformation of the respective axle shaft to determine the value of the torque transmitted by the axle shaft to the relative rear wheel.

64. (New) A vehicle as claimed in Claim 62, wherein the central control unit predicts time changes in the angular rotation speed of each rear wheel, using the value of the torque transmitted by respective axle shaft, and controls the regulating device to regulate the lock percentage (%L) of the differential as a function of future time changes in the angular rotation speed of each rear wheel.

65. (New) A vehicle as claimed in Claim 62, wherein the central control unit estimates a target value of the lock percentage (%L) of the differential as a function of the dynamic parameters of the vehicle, and controls the regulating device by means of a feedback control loop employing as a feedback variable the value of the lock percentage (%L) of the differential.

66. (New) A vehicle as claimed in Claim 65, wherein the regulating device comprises a solenoid valve controlled to vary the lock percentage (%L) of the differential, and a second sensor for detecting the value of the current (I) circulating through the solenoid valve; the central control unit controlling the regulating device by means of a first control loop employing the value of the lock percentage (%L) of the differential as a feedback variable, and a second control loop within the first control loop and employing as a feedback variable the value of the current (I) circulating through the solenoid valve.

67. (New) A vehicle as claimed in Claim 62, wherein the central control unit estimates a target value of the lock percentage (%L) of the differential as a function of the dynamic parameters of the vehicle, and controls the regulating device by adding a feedback control loop employing the value of the lock percentage (%L) of the differential as a feedback variable, and a direct open control loop employing the target value of the lock percentage (%L) of the differential as a control variable.

68. (New) A vehicle as claimed in Claim 67, wherein the regulating device comprises a solenoid valve controlled to vary the lock percentage (%L) of the differential, and a second sensor for detecting the value of the current (I) circulating through the solenoid valve; the central control unit controlling the regulating device by means of a first control loop employing the value of the lock percentage (%L) of the differential as a feedback variable, and a second control loop within the first control loop and employing as a feedback variable the value of the current (I) circulating through the solenoid valve.

69. (New) A rear-drive vehicle comprising:

a self-locking differential;

an engine producing a drive torque (Tm) which is transmitted to the rear drive wheels by the self-locking differential;

an accelerator pedal which modulates the drive torque (Tm) generated by the engine;

a brake pedal which modulates a brake torque acting on the vehicle;

a number of sensors for real-time detecting respective dynamic parameters of the vehicle;

a regulating device for regulating the lock percentage (%L) of the differential; and

a central control unit for controlling the regulating device to regulate the lock percentage (%L) of the differential as a function of the dynamic parameters of the vehicle;

the vehicle is characterized in that when cornering at substantially steady speed, the central control unit estimates the road grip of the wheels, zeroes the lock percentage (%L) of the differential when the road grip of the wheels is far from the grip limit, and gradually increases the lock percentage (%L) of the differential when the road grip of the wheels nears the grip limit.

70. (New) A vehicle as claimed in Claim 69, wherein the central control unit reduces the lock percentage (%L) of the differential to zero when the road grip of the wheels is almost at the grip limit.

71. (New) A vehicle as claimed in Claim 69, wherein, as the road grip of the wheels nears the grip limit, the central control unit gradually increases the lock percentage (%L) of the differential in proportion to the value of the lateral acceleration (Ay) of the vehicle and the value of the speed (V) of the vehicle.

72. (New) A vehicle as claimed in Claim 69, wherein the central control unit zeroes the lock percentage (%L) of the differential when the value of the turning angle (Dvol) of the vehicle is substantially directly proportional to the value of the lateral acceleration (Ay) of the vehicle, and gradually increases the lock percentage (%L) of the differential when no

substantially direct proportion relationship exists between the value of the turning angle (Dvol) of the vehicle and the value of the lateral acceleration (Ay) of the vehicle.

73. (New) A vehicle as claimed in Claim 69, wherein the central control unit estimates the road grip of the wheels by estimating the value of the lateral acceleration (Ay) of the vehicle.

74. (New) A vehicle as claimed in Claim 69, wherein the central control unit estimates the road grip of the wheels by estimating the value of the turning angle (Dvol) of the vehicle and value of the lateral acceleration (Ay) of the vehicle.

75. (New) A vehicle as claimed in Claim 69, wherein, when driving along a substantially straight route, the central control unit zeroes the lock percentage (%L) of the differential in normal driving mode, and gradually increases the lock percentage (%L) of the differential in sport driving mode.

76. (New) A rear-drive vehicle comprising:

a self-locking differential;

an engine producing a drive torque (Tm) which is transmitted to the rear drive wheels by the self-locking differential;

an accelerator pedal which modulates the drive torque (Tm) generated by the engine;

a brake pedal which modulates a brake torque acting on the vehicle;

a number of sensors for real-time detecting respective dynamic parameters of the vehicle;

a regulating device for regulating the lock percentage (%L) of the differential; and

a central control unit for controlling the regulating device to regulate the lock percentage (%L) of the differential as a function of the dynamic parameters of the vehicle;

the vehicle is characterized in that when driving along a substantially straight route, the central control unit zeroes the lock percentage (%L) of the differential in normal driving mode, and gradually increases the lock percentage (%L) of the differential in sport driving mode.